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10/526,556	07/25/2005	Michael J. Evans	M0025.0320/P320	7425

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EXAMINER	
DINH, TRINH VO	

ART UNIT	PAPER NUMBER
2821	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/526,556	EVANS ET AL.	
	Examiner	Art Unit	
	Trinh Vo Dinh	2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) *23 and 24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-22* is/are rejected.

7)☒ Claim(s) *6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/19/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "**biasing means** configured to apply a bias between facing edges of adjacent electrodes, said biasing means being configured to bias the electrodes such that the current density at their facing edges exceeds the current density at which electromigration occurs" in claim 19 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 recites "*the gap between facing edges is at most 1μm*". It is unclear if "facing edges" are the facing edges of the electrodes" or not. If they are, the recitation is suggested changing "facing edges" to –the facing edges--. In addition, there is no support in the specification for the recitation "the gap between facing edges is at most 1μm". Differently, the specification, page 3 lines 11 stated "the facing edges of adjacent electrodes are separated by a gap of less than l00 μm" or "the space in between the facing edges of adjacent fingers may be less than 1μm". Therefore, it is unclear if the Applicant intends to claim *the gap between facing edges of* ***adjacent fingers*** *is at most 1μm* or *the gap between the facing edges of the electrodes is at most 10μm*". For purpose of examination, the claimed recitation is best understood as "the gap between the facing edges of the electrodes is at most 100μm".

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5, 7-10, 14-15, 17-18 and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Slayman et al (US 4,696,648).

Respecting claim 1, Slayman discloses, in Figs. 1-2, a photoconductive material (14, 20) and a plurality of spaced apart electrodes (16, 18) provided on said photoconductive material, each electrode having at least one facing edge which faces a facing edge of an adjacent electrode, a physical barrier (col. 1 line 68) being provided abutting a facing edge of at least one electrode, said barrier extending to at least the full height of said facing edge.

Respecting claims 2-4, Slayman discloses the facing edge of the at least one electrode is provided within a recess of the surface of said photoconductive material, such that a side-wall of the recess provides said barrier, wherein the facing edges of adjacent electrodes are provided within recesses, such that the side walls of said recesses provides the barriers for both facing edges, and wherein photoconductive material (20) is provided between said adjacent facing edges, and said sidewalls extend to at least the full height of said facing edge.

Respecting claim 5, Slayman discloses a capping material (portion of 20 on top of 16, 18) being provided over the electrodes (16, 18).

Respecting claims 7-8, Slayman discloses, in col. 3 lines 40+ and col. 5 line 65 to col. 7 lines 1+, the height of the side walls exceeds the height of the said facing edge by at most the penetration depth of the radiation used to excite the antenna, in the photoconductive material.

Respecting claims 9, 14-15 and 17-18, Slayman discloses the height of the sidewalls exceeds the height of the facing edge by at most 1μm and the gap between facing edges is at most 100μm (col. 7 line 57) wherein two electrodes (16, 18 in Fig. 1), comprise a plurality of

elongate fingers, provided in an interdigitated arrangement with the facing edges being provided by the elongate edges of adjacent fingers. Further, Slayman discloses the photoconductive material comprises a least one selected from LT-GaAs, LT AlGaAs, As-GaAs or LT-InGaAs (col. 3 lines 18+), and said electrodes comprise at least one selected from Gold, Aluminium, Titanium, NiCr or Pd (col. 5 lines 10+).

Respecting claim 10, Slayman discloses the electrodes (16, 18) are provided on a planar surface of said photoconductive material (14) and a capping material (a portion of 20) is provided on the facing edges of said electrodes such that said capping material forms said barrier.

Respecting claims 20-22, Slayman discloses, col. 7 line 65+, means for measuring the current flowing through the electrodes, and radiation is detected and irradiated in the frequency range from 0.25GHz to 100THz (col. 6 lines 28+).

6. Claims 1, 10 and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al (US 5,028,971).

Respecting claim 1, Kim discloses, in Figs. 1 and 6, a photoconductive material (100, col. 1 lines 11-16) and a plurality of spaced apart electrodes (101, and 6 and col. 3 line 46 to col. 4 line 50) provided on said photoconductive material, each electrode having at least one facing edge which faces a facing edge of an adjacent electrode, a physical barrier (in Fig. 6) being provided abutting a facing edge of at least one electrode, said barrier extending to at least the full height of said facing edge.

Respecting claims 17-18, Kim discloses, in col. 3 line 46 to col. 4 line 50, the photoconductive material comprises a least one selected from LT-GaAs, LT AlGaAs, As-GaAs

or LT-InGaAs (col. 3 lines 18+), and said electrodes comprise at least one selected from Gold, Aluminium, Titanium, NiCr or Pd (col. 5 lines 10+). Kim further discloses radiation is irradiated in the frequency range from 0.25GHz to 100THz.

7. Claims 1, 17-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Burroughes et al (US 5,371,399).

Respecting claim 1, Burroughes discloses a photoconductive material (16, 12 in Fig. 2B) and a plurality of spaced apart electrodes (28 in Figs. 2A-2B) provided on said photoconductive material, each electrode having at least one facing edge which faces a facing edge of an adjacent electrode, a physical barrier (15b) being provided abutting a facing edge of at least one electrode, said barrier extending to at least the full height of said facing edge.

Respecting claim 10, Burroughes discloses the electrodes (28) are provided on a planar surface of said photoconductive material (16, 12) and a capping material (15b) is provided on the facing edges of said electrodes such that said capping material forms said barrier.

Respecting claims 17-18 and 20, Burroughes discloses the photoconductive material comprises a least one selected from LT-GaAs, LT AlGaAs, As-GaAs or LT-InGaAs (col. 3 lines 37+, col. 9), and said electrodes comprise at least one selected from Gold, Aluminium, Titanium, NiCr or Pd . Burroughes further discloses radiation is irradiated in the frequency range from 0.25GHz to 100THz (col. 3 lines 34-36).

8. Claims 1 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by YAMAMOTO, HIROCHIKA (JP 11-243217).

Respecting claim 1, YAMAMOTO discloses, in Figs. 1-3, a photoconductive material (2) and a plurality of spaced apart electrodes (3) provided on said photoconductive material, each

electrode having at least one facing edge which faces a facing edge of an adjacent electrode, a physical barrier (6) being provided abutting a facing edge of at least one electrode, said barrier extending to at least the full height of said facing edge.

Respecting claim 19, YAMAMOTO discloses, in the Abstract, biasing means configured to apply a bias between facing edges of adjacent electrodes, said biasing means being configured to bias the electrodes such that the current density at their facing edges exceeds the current density at which electromigration occurs.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 11-13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable Slayman or Kim or Burroughes.

Respecting claims 11-12, Slayman or discloses or Burroughes every features of the claimed invention except capping material being an antireflector material or one of silicon nitride, silicon dioxide, polymide or acrylics. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select antireflector material or polymide or acrylics for capping material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended uses as a matter of obvious design choice.

Respecting claim 13, Slayman or Kim or Burroughes discloses every features of the claimed invention except electrodes being in bow-tie configuration. However, it would have been an obvious matter of design choice to have the electrodes being a bow-tie shaped, each electrode having a triangular portion and being arranged such the apexes of said triangular portion face each other and are spaced apart, said facing edges being provided by said apexes since such a modification would have involved a mere change in the shape of a radiating elements (referred to US 5,663,639 or US 6,325,294 which teaches the claimed tie-bow electrodes). A change in shape is generally recognized as being within the level of ordinary skill in the art.

Respecting claim 16, Slayman further discloses the gap between facing edges being most 10μm (col. 7 line 57).

Allowable Subject Matter

11. Claims 6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

The cited art of record fails to teach, in a combination with other limitations, a capping material is provided over at least a part of the facing edges such that said capping material and the sidewalls of said recess form said barrier.

Inquiry

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trinh Vo Dinh whose telephone number is (571) 272-1821. The

examiner can normally be reached on Monday to Friday from 9:30AM to 6:00PM.The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Owens, can be reached on (571) 272-1662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art unit 2821

May 06, 2008

/Trinh Vo Dinh/

Primary Examiner, Art Unit 2821